AMERICAN

Institute Mining Engineers.

HALIFAX MEETING,

SEPT. 16 & 17, 1885.

HALIFAX, N. S.:
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1885.

THE VISIT OF THE

American Institute of Mining Engineers.

LOCAL EXECUTIVE COMMITTEE.

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VICE-CHAIRMAN:

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Hon. Sec'y. and Treasurer—E. Gilpin, Jr., F.G.S., F.R.S.C., Inspector of Mines.

Those marked * are members of the Institute.

GENERAL COMMITTEE.

CHAIRMAN:

Sir Adams G. Archibald, K.C.M.G.;

The Honorable Provincial Secretary;
Members of the Executive Council;
Members of the Legislative Council and Assembly;
Nova Scotia Members of the Dominion Senate and House of Commons;

Members of the Coal Managers' Associations of Pictou and Cape Breton;

The Wardens of Cape Breton, Pictou, Cumberland and Hants;

United States Consul Phelan;

Major-General Laurie;

Messrs. J. S. Maclean, S. H. Holmes, Chas. Annand, D. McPherson, Prof. Lawson, E. Gilpin, Jr., Prof. Fraser, P. Innes, E. W. Dimock (Windsor), A. A. Hayward (Renfrew), J. W. Carmichael (New Glasgow), Graham Fraser (do.), W. G. Matheson (do.), G. Jamnie (Londonderry), J. W. McDonald (do.), D. McGillivray (Sydney), J. E. Burchell (do.), S. MacDonnell (Port Hood), C. E. Brown (Yarmouth), P. McNaughton (Joggins).

CITIZENS' COMMITTEE.

CHAIRMAN:

Mayor Mackintosh.

Aldermen T. Spelman, J. E. Wilson, A. Stephen, G. McLellan, H. F. Worrall; Sir William Young, Chief Justice McDonald, the Hon. Provincial Secretary, the Commissioner of Mines, Hon. J. W. Longley, Hon. Attorney-General, Senator Power, Hon. Robt. Boak, Hon. Jas. Butler, Hon. W. J. Stairs, M. B. Daly, M.P.; Prof. Lawson, Principal Forrest, Dr. Parker, Rev. D. Honeyman, Rev. Dr. Burns, John Kelly, Dep. Com. of Mines, E. H. Keating, M. Murphy (Prov. Eng.), M. Bowman, Hon. A. G. Jones, Adam Burns, John Doull, H. H. Fuller, T. E. Kenny, W. Lawson, Chas. Annand, Geo. Mitchell, W. C. Silver, F. C. Sumichrast, J. R. Lithgow, H. W. Blackadar, S. H. Holmes, F. B. Crofton, W. Roche, Jr.; J. P. Mott, Jas. Thomson, J. J. Stewart, F. C. Elliot, Peter Jack, E. Gilpin, Jr.; S. D. McDonald, Rod. Macdonald, C. A. Stayner, W. McKerron, F. C. Stevens, D. McPherson, G. Francklyn, J. E. Handman, H. W. Johnston, R. Motton, Dr. Somers, W. Gossip, G. J. Dustan.

FINANCE.

J. F. Stairs, M. P., Chairman; Brooks Chipman, Hon. W. Ross, W. L. Lowell, J. S. Maclean, S. M. Brookfield, C. A. Stayner.

RECEPTION.

M. J. Power, M.P.P., Chairman; Prof. McGregor, Col. Ackers, R. E.; M. B. Daly, M. P.; Sheriff Archibald, Ald. McInnes, Hon. J. W. Longley. M. P. P.

DINNER.

T. E. Kenny, Chairman; S. H. Holmes, Ald. Pearson, H. H. Fuller, E. Farrell, M. D.; A. Burns, John Doull, L. G. Power, Ald. Pearson, Ald. McInnes.

F. C. SUMICHRAST, Sec'y.

THE VISIT.

The selection of Nova Scotia as a meeting place for the American Institute of Mining Engineers this Fall has proved a surprise and a gratification to the people of the Lower Provinces. As railways and steamers have of late years done much to make us acquainted with our cousins of the United States, this formal visit of an Institute representing the important and varied industries of the Miner, who gave last year to his country four hundred and thirteen million dollars worth of minerals, can be regarded as the outcome of the friendly feelings which have thus grown up. Geologically speaking, the choice was a wise one, Nova Scotia being the most interesting part of the Dominion, for here are presented the most typical carboniferous sections in the world, and we can show mines of coal, gold and iron, which—not equalling those controlled by our visitors—are still of interest, and capable of unlimited development. Our deposits of gypsum, antimony and manganese are unrivalled, and the gypsum quarry of Windsor is probably the largest in the world.

The following notes may serve to indicate the points that may interest the members of the Institute, and to show that we are glad of an opportunity to display what we have, to impart the experience we may have acquired, and to learn from those whose labors extend over so wide a field.

CITY OF HALIFAX.

Naturally the City of Halifax forms the headquarters of the Institute during its sessions, and it is to be regretted that a stay long enough to ripen acquaintance into friendship could not be included in the programme.

The town was founded in 1749, by an expedition under the command of the Hon. Edward Cornwallis, and from a little settlement cowering behind palisades it has gradually spread along the water side until it numbers some forty thousand people. The natural advantages

offered by its large and well sheltered harbor were the determining causes that led to its selection as the future Capital of the Province. Its historical annals are of interest to the members of an American Institute, as on its broad harbor were gathered many of the expeditions and fleets whose fortunes form part of the common history of this Continent, notably that destined for the siege of Louisburg; and no nation can point to a more illustrious feat of arms than the capture of that fortress by the pioneers of the New England States. And although no enemy has yet cast up works against it, rings and bolts mark the positions of the chains which guarded the port against "surprise" parties, an amusement at one time fashionable with our respective ancestors.

To a visitor arriving by sea, the Citadel appears the most prominent object, and a walk around it readily shows the relative positions of the principal objects of interest. The town spread below, the harbor and village of Dartmouth are in the foreground, and the Atlantic and the spruce-covered hills close the view. Behind the Citadel is the Common, used for reviews; beyond the Citadel, grounds for cricket, polo, etc. South of the Common a space of about fifteen acres has been reserved for a City gardens. They are laid out with ornamental waters, shrubberries, flowers, etc., and our New York visitors are always kind enough to say they prefer them to the Boston Gardens.

Still continuing to the South are met the School for the Blind, City Hospital, and the pleasant fields and waters of the North-West Arm, a narrow branch of the Harbor, forming with the inner waters of the Harbor the peninsular on which the town stands. The Imperial authorities have several forts on a large tract of pine and fir covered ground at the junction of the Arm with the Harbor; and out of this bit of wilderness, deeded to the God of War, they and the City have jointly planned a charming park. Carriage roads and paths lead in a bewildering maze, and the visitor now shudders under the black muzzles of a battery, or looks up the peaceful waters of the Arm, with its summer-houses and boats, or from the surf-beaten shore can fashion the Western Islands from the low lying clouds, and study the groovings which marked the passage of the ice floes and bergs of a bygone world.

Halifax does not abound in architectural relics, although its

bituminous coal fires have given an antique coloring to its wooden houses, and make the Pittsburgher feel at home. The Provincial Building, erected in 1809, was built of native stones from various parts of the Province. Its chambers have been put at the service of the Institute, and the portraits of the English Sovereigns connected with our colonial history, and of our favorite governors and statesmen, which adorn its walls, are by celebrated artists, among whom may be mentioned Benjamin West. It also contains a library for the use of the Legislative Council and House of Assembly.

In the Dominion Building, used for a custom house, post office, etc., is the Provincial Museum, which gives an idea of the Geology and resources of Nova Scotia. A few yards from this building are the docks of the Dartmouth Ferries, from whose decks a good view may be had of the town and harbor.

Geologically speaking, the town stands on a long, rounded hill, composed principally of dark slates forming the upper part of the auriferous measures, referred by Sir William Dawson to the Lower Cambrian. Little veinlets of auriferous quartz frequently occur in it, so that none can deny us some claim to the boast that our streets are paved with gold. Wherever the scanty cover has been removed, its surface shows the grooves made by the ancient boulder-laden ice fleet swept South by the precursor of the irresistable current still flowing from the North past our shores. Beyond the Arm are interesting sections of the junction of the slates and the intrusive granites.

HALIFAX MEETING.

Programme of Sessions and Local Excursions.

By kindness of the Provincial Government, the Province Building has been placed at the disposal of the Institute for the Sessions.

WEDNESDAY, Sept. 16, 10 a. m.—Opening Session: Speeches by Sir Adams G. Archibald, K.C.M.G.; Chairman of General Committee; His Worship the Mayor of Halifax, J. C. Mackintosh, Esq.; the Hon. the Provincial Secretary, followed by the inaugural address of the President, J. C. Bayles, Esq. Routine business, papers, etc.

2 p. m.—Excursion on the Harbor, given by the citizens.

8 p. m.—The Commissioners of the Public Gardens have tendered complimentary tickets to the members of the Institute for an open air Concert with Fire Works, etc.

THURSDAY, Sept. 17.—Excursion to Montague Gold Mines, given by the Executive Committee. The party will leave town by the 9.30 a. m. ferry boat.

2.30 p. m.—Session.

7 p. m.—Session—to adjourn 9 p. m. to a reception given by the citizens in the Legislative Council Chamber (Province Building.)

During Thursday His Excellency Vice Admiral Sir J. E. Commerell, V.C., will allow a visit to the iron-clad flagship the "Northampton," and the steam launch "Arrow" will, by the kindness of Messrs. S. Cunard & Co., run between the Queen's wharf and the flagship for the conveyance of members of the Institute, on a time table to be seen at headquarters.

The following papers have been announced for this meeting. Which of them will be read in full, and which by title only, cannot be determined beforehand. But it is understood that most of the papers referring to places to be visited during this meeting will be presented in full. The arrangement of the programme of each session is in the hands of the Council:

The Amalgamation of Gold Ores, and the loss of Gold in Chloridizing Roasting. By C. A. Stetefeldt, N. Y. City.

Steel Castings. By A. V. Abbott, N. Y. City.

Lixiviation and Amalgamation Tests. By F. W. Clarke, Boston, Mass.

The Specific Gravity of Low-Carbon Steels. By G. S. Miller, Benwood, W. Va.

The manufacture of Iron in Canada. By J. H. Bartlett, Montreal, Canada.

The Coal Fields of Cumberland Co., N. S. By R. G. Leckie, Springhill, N. S.

The Homogeneity of Open-Hearth Steel. By H. H. Campell, Steelton, Pa.

Improvements in Ore-Crushing Machinery. By S. R. Krom, N. Y. City.

Note on a Self-Dumping Water Tank. By W. Ide Pierce, Tangier, N. S.

Studies in the Apatite Region of Canada. By Dr. D. Sterry Hunt, Montreal, Canada.

The Estimation of Manganese, Carbon and Phosphorous, in Iron and Steel. By Prof. Byran W. Cheevir, Ann Arbor, Mich.

E. D. Campbell's Colorimetric Process for Estimating Phosphorous in Iron and Steel. By Prof. Bryan W. Cheevir, Ann Arbor, Mich.

The Oil Regions of Pennsylvania and New York. By C. A. Ashburner, Phil., Pa.

The Contraction of Iron under Sudden Cooling. H. M. Howe, Boston, Mass.

Topographical Models and their uses. A. E. Lehman, Phil., Pa.

The Philosophy of Fire Brick, Hot Blast Stoves. By Fred. W. Gordon, Philadelphia, Pa.

An Electrical Furnace for Reducing Refractory Ores. By Dr. T. Sterry Hunt, Montreal, Canada.

The Nova Scotia Gold Mines. By E. Gilpin, Inspector of Mines, N. S.

The Wolf Benzine-burning Safety Lamp. By E. J. Schmitz, Columbia, S. C.

Our Glacial Problem. By Rev. D. Honeyman. Halifax, N. S.

The Cape Breton Coal Field. By W. Routledge, Sydney, C. B.

The Pictou Coal Field. By H. S. Poole, Stellarton, N. S.

EXCURSIONS.

The following notes will serve to indicate the principal points of interest on the excursions proposed by the Local Committee. These excursions have, as far as circumstances will permit, been planned so as to show the chief mining industries, and the routes most favored by lovers of the picturesque:

MONTAGUE GOLD MINES.

The route to these mines lies across the harbor to Dartmouth; thence for about five miles along a chain of lakes, which, with the Shubenacadie River, formed an old Indian highway across the Province. These Mines are worked by the Albion (English) Gold Mining Company which, after the necessary preliminary work, has settled down to steady mining. The district represents in a general way all our gold fields. The principal points are quartz veins, free gold, combined pumping, hoisting and milling gear—amalgamation in battery and outside plates.

WINDSOR AND ANNAPOLIS.

*This excursion leaves Halifax, Friday, Sept. 18, at 8 a. m., and reaches Windsor at 9.55 a. m. Visit, by driving, the St. Croix plaster quarries, two miles from Windsor. The College and Clifton residence of "Sam Slick" can also be visited. Lunch at Windsor at 1 p. m. Then leave Windsor by special train, for Grand Pre (the home of Evangeline) where a stop will be made, to visit the site of the village, dykes, church, etc.; thence by Wolfville, Kentville and Bridgetown, through the apple country to Annapolis Royal.

SATURDAY, A. M.—Annapolis Royal, former Capital of Nova Scotia, with old fort, the scene of many battles and sieges. Iron ore of Clementsport—Triassic trap of Granville. In the afternoon leave by steamer for Digby and St. John, 45 miles across the Bay of Fundy.

*All times given are local and one hour faster than the so called Eastern Standard time of the railways.

LONDONDERRY AND SPRINGHILL.

Excursion tendered by the Steel Co., of Canada, and the Cumberland Railway and Coal Co., and under the direction of R. G. Leckie and G. Jamme, Esqs.

By leaving Halifax Friday morning, Sep. 18, at 7.30, the Londonderry and Springhill Mines can be visited and St. John reached Saturday morning. Parties so desiring can also—after spending Friday in the Pictou district—return by Saturday morning train to Truro, visit Londonderry, and proceed same evening to St. John.

The Springhill mines cover 13 square miles, and are connected by 27 miles of railway with Parrsboro, on the Bay of Fundy, and by four miles of railway with the Intercolonial system. Four working slopes have been sunk to depths up to 1200 feet on several seams, from 6 to 13 feet thick. The output is from 1500 to 2000 tons a day. The principal points of interest are the systems of bord and pillar, pillar, and long wall work. The pumps are Allison Cataract, with 30 inch cylinders and 6 ft. stroke. The winding engines are double cylenders, 16 to 30 in. in diameter, Lechner coal cutting machines, air compressors, shaking and revolving screens.

LONDONDERRY IRON WORKS.

Deposits of limonite and sideroplesite in strata of upper silurian-age, worked by a dits, at Folly Mtn. and West Mines. Two blast furnaces, 65ft high, 19ft. diameter, with blast heated in Cowper Siemens stoves to temperature of 800 degrees to 1100 degrees Fah. Puddling furnaces, rolling mill and foundry—coke ovens for Pictou and Springhill Coal,—calcining furnaces, etc, etc.

PICTOU EXCURSION.

Under the auspices of the Coal Managers' Association of Pictou, and the Town of New Glasgow.

Leave Halifax, Friday, Sept. 18, at 7.30 a. m., for Stellarton. Proceed to Westville and visit Intercolonial and Acadia Mines. Return to Stellarton to lunch given by the Coal Mining Association. Then visit the Albion Mines and proceed to Trenton to Steel and Glass Works return to New Glasgow for the night.

(All above excursions will be on the rail and within a radius of five miles of New Glasgow.)

SATURDAY, Sep. 19—Excursion to Vale Colliery at 8 a. m., or drive given by the Town of New Glasgow to the top of Fraser's Mountain; lunch at hotel, and leave by special train (provided by the Executive Committee) for the Strait of Canso for Cape Breton.

The following are the points of interest in the Pictou Excursion:

DRUMMOND MINE,—11 to 13 ft. of coal worked; seam dips 15 degrees, worked by slopes, now 2,800 ft. long; lifts every 450 ft.; counterbalance planes every 700 ft.

Ventilation by exhaust fan, 20 ft. by 7 ft.; speed 52 to 56 per m.; current 100,000 ft. per m.—alternative jet in upcast; lamps, Clanny.

Winding engine pr 16 in. by 24 in.; V friction geared 2 to 1; drums 8 ft. dia.; work singly or connected; hauls gross wt. 11,400 lbs.; up 1800 ft. 1 m. 50 sec.; lowered by break in 1 m.; W. engine under'gd.; single compound 16 in. and 28 in.; pinion fitted with Fisher's pat. clutch; engine with Joyce's pat. expansion valve gear (new); steam pipe 5 in.

Pumping.—3 steam pumps, one 18 in. and 8 in., by 36 in; vertical lift 347 ft.; column 10 in. cast; independent condenser boilers steel, 30 ft. by 5.5 ft. 2 flues; and egg end; flash 30 ft. by 3.5 ft.

ACADIA PIT, at Westville, 3 m. from Stellarton on I. C. R.

Seam of 10 ft. worked; dip averages 27 deg.; slope 2,350 (sinking 600 ft); extreme vertical depth 1,300 ft.

System of working: In lifts of 400 ft. counterbalance planes every 700 ft., with few primary narrow bords, driven in and outbye, followed by prompt pillar working outbye from boundaries.

Ventilation by fan 24 ft. by 8 ft., iron casing; engine 20 in. by 20 in. cut off; water gauge, barometer, &c.; Liveing's gas indicator.

Lamps—Mueseler and Marsaut.

Hoisting engine on slope, pr. 16 in. cyl., 42 in. stroke; geared 3.5 to 1; drum, 9 ft.; piston speed (usual) 1,100 ft per m.

Pumping:—Duplex compound condensing, 22, 12 in. by 24 in., rams 5.5 in.; column length, 2,400 ft., vertical head, 990 ft., wrot pipe, tarred, 6 in. upset ends vanishing threads, metal flanges, no leaks; steam pressure on top 105 lbs., pipe 4 in., covered with infusorial earth from a local deposit; air feeder added to air chamber.

Boilers:—Water tube; fuel, culm; grates, perforated plates, and Howe's Raker, with steam jet in ash pit.

Screens, double:—Primary 6 in.; secondary, ¾ in. apart curved; 5 sizes of coal; elevator, revolving and shaking screens; cmas and spring pole; Clarke's jig.

ALBION MINES at Stellarton, on I. C. R.—Railway second built in America; locomotives include "Samson," built in 1838, and exhibited at Chicago Exhibition; Main Seam, 38 ft. thick; 148 ft. lower; Deep Seam, 22 ft. thick; Foord Pits, vertical, 900 ft. deep; sunk to Main Seam; scene of explosion in 1880; loss of life, 44; workings now free of water; machinery massive; hoisting engine, 38" cyls., 5 ft. stroke, 18 ft. dia. Drum; Cornish pumps, 62 in. cyl., 9 ft. stroke; beam, 34 ft. long, 7 ft. deep in the middle; weight, 18 tons; working barrel, 18" dia.

Air compressors in course of erection at time of explosion and now rendered useless in present position; steam cyls., 36"; dia. do., 40"; stroke, 6 ft.; flywheel, 22 feet dia.; weight, 20 tons; present workings in lower seams; capacity, 1,000 tons per diem; ventilation by furnace and fans; the latter 30 ft. dia. x 10 ft. wide; lamps, Mueseler and Clanny; coal used for coking purposes; 104 ovens; bee-hive, 10 ft. dia.; average pitch of seam, 22 degrees.

VALE MINE—6 m. E. of New Glasgow, works two seams; McBean by slope 2,400 ft. long; dips 30 to 35 degrees; vertical depth, 1,350 ft.
System of working, per levels at 500, 800, 1,300, 1,800 and 2,300 ft. on slope; bords followed by pillar robbing; coal run down in shoots from boad ends; roof very tender.
Ventilation by fan, 30 ft. by 10 ft.; engine, 24 in. by 36 in.; casing of stone; lamps, Marsaut and Clanny.
Winding engine, pr. direct, 32 in. by 60 in. stroke; drums, 14 in. dia.; steel ropes, 1.5 in. dia.
Pumps, 30 in., with 7 in. rams by 36 in.; independent condenser; vertical lift, 840 ft.; other pumps, 20 in. by 36 in. and 18 in., with 6 in. rams by 24 in.
Boilers, 6 steel; return flue, 30 ft. by 5.5 ft.; 7 egg end 30 ft. by 3 ft.
Six foot seam—Slope, 1,100 ft.; outcrop for 500 left unworked; a new winning ventilated by compression fan, 16 ft. by 6 ft.; engine, 10 in. by 16 in.

FACTORIES.

At New Glasgow, besides machine and boiler shops and foundries, one shop is fitted for heavy forgings.

A GLASS FURNACE, where lamps and chimnies are blown, and pressed tableware made.

STEEL WORKS, the only one in Canada; fitted with a 10 ton Siemen's Regenerator Melting Furnace, heating furnaces, 4 Wilson's Gas Producers, a 26 in. cogging mill, with 9 in., 16 in. and 22 in. bar, and sheet mills, with shears for 7 in. sq. hot billets; a 3 in. reeling machine, a 25 ton testing machine, a pr. steam reversing, 36 in by 48 in.; engines to drive the cogging mill, other engines, etc.

CAPE BRETON.

Excursion given by the Executive Committee and the Coal Managers' Association of Cape Breton.

Train leaves New Glasgow Saturday, September 20, at 12, noon, and reaches the Strait of Canso, dividing Nova Scotia and Cape Breton, at 3.10 p. m. The steamer "Marion" will at once leave with the party and proceed to Baddeck, where she will remain over Sunday. Leaving Baddeck Monday morning, the party will arrive at Sydney at 10 a. m. and those desirous of so doing, can visit Coxheath Copper Mines and

the Low Point Coal Mines. In the evening the party will be entertained by the Town of Sydney and the Coal Managers' Association.

TUESDAY, Sep. 22—Two excursions are proposed one to Louisburg, and one to the Bridgeport, Glace Bay and Cow Bay Mines.

WEDNESDAY, Sep. 23—Visit to the Sydney Mines and North Sydney, and leave by "Marion" Wednesday evening to reach Mulgrave Thursday morning for train to New Glasgow and the West.

The points of interest on the route are the scenery of Merigomish and Antigonish, St. Peter's Canal, replacing the Indian and French *portage*, and connecting the Atlantic and Bras d'Or Lake, the windings of Lennox and St. George's Passages, Grand Narrows, "Baddeck and that sort of thing." The Big entrance to the Lake, Kelly's Cove and Sydney Harbor.

SYDNEY MINES, started in 1766; shaft 665 feet deep, with iron tubbing, sub-marine workings; six miles of wire rope in underground haulage; self-emptying shipping shoots, direct acting Cornish pump and Guibal fan. At the Low Point, Glace Bay, Caledonia, Reserve and International Mines are examples of underground haulage, bord and pillar, and pillar workings in flat and pitching seams, narrow-gauge railways, Fairlie Double-end Locomotives, shipping piers and artificial harbors, with English and American pumps, machinery, etc.

At the COW BAY MINES may be seen breakwaters, special columns and pumps for acid pit waters, modified long wall and pillar workings, old French Mines, 1720, and Yeadon's Briquette Machines.

At all points along the shore are continued sections of carboniferous strata, showing conditions of deposition of coal beds, and including strata. Near Sydney can also be seen deposits of gypsum, copper mine at Coxheath; also, iron ores; (Laurentian) near East Bay.

The Secretary regrets that, owing to misunderstanding, full details of the various "points" of the Cape Breton pits were not received in time for insertion; and he would remark that nature has by favoring seams, absence of gas and water, and propinquity to shipping, obviated the necessity of a struggle with the genii of the nether world necessitated in other countries.

Guide books and maps can be had at Morton's News Agency, Hollis Street.

E. GILPIN, JR.,
Hon. Sec'y.